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DEVELOPMENT OF *MELOIDOGYNE INCOGNITA* AND *M. JAVANICA* IN SOYBEAN ROOTS

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There have been several studies on the pathogenicity and host-parasite relationships of root-knot nematodes (Dropkin, 1959, 1963; Dropkin and Nelson 1960; Ibrahim *et al.*, 1972) but there is little information about the development of these nematodes on soybean. In Egypt, root-knot nematodes are abundant in soybean fields and capable of causing damage (Ibrahim *et al.*, 1972 and 1976). Studies of root-knot nematode development and life cycles are important in determining the reproductive potential of these nematode species. The objectives of the present study were to determine the post-infection development of *Meloidogyne incognita* (races 1 and 3) and *M. javanica* on soybean cv. Cobb and the effect of soybean cvs Calland (susceptible) and Bragg (resistant) on the development of *M. incognita* race 3.

Materials and Methods

Meloidogyne incognita race 1 (MI-1) and race 3 (MI-3) and *M. javanica* (MJ) used in this study were isolated from infected roots of soybean and tomato plants grown in Behera governorate, identified by Sasser's differential host plants and increased on tomato (*Lycopersicon esculentum* Mill cv. Rutgers) for about 60 days in the greenhouse.

To study the development of MI-1, MI-3 and MJ in soybean roots, seeds of the soybean cv. Cobb were planted in steamed sandy clay soil in 15 cm clay pots. Seven days after emergence, seedlings were thinned to two per

pot and inoculated with 5,000 second stage juveniles of MI-1, MI-3 or MJ per pot. Root samples from four pots of each nematode treatment were collected at 6, 12, 24, 48 hrs then at intervals of 2-5 days until 50 days after nematode inoculation. Galled parts of infected root samples were fixed in FAA solution and processed as described by Ibrahim and Massoud (1974) for studying nematode development.

The development of MI-3 on soybean cvs Bragg (resistant) and Calland (susceptible) was studied in a second test. Seeds of the cultivars were sown in steamed sandy clay soil in 15 cm clay pots. Seven days after emergence, seedlings were thinned to two per pot and each pot inoculated with 5,000 nematode eggs. Root samples from four pots of each cultivar were collected at 2, 4, 6, 8, 10 days and then at intervals of 5 days until 60 days after nematode inoculation. Galled parts of infected root samples were processed as described earlier for studying nematode development.

Results and Discussion

The development of MI-1, MI-3 and MJ in roots of soybean cv. Cobb proceeded normally to the egg-laying female stage with some variation. Infective second stage juveniles (J2) of the tested nematode populations penetrated the roots within 12 hrs after nematode inoculation of the soil. The third-stage juveniles of MI-3 appeared after 6-8 days and those of MI-1 and JM after 10 days. The fourth-stage juveniles were observed after 15 days for MI-1 and MI-3 and after 20 days for MJ. Young females of MI-1 were found after 20 days whereas those of MI-3 and MJ appeared after 30 days. Egg-laying females were detected after 35 days in MI-1 and after 40 days in MI-3 and MJ. The second generation juveniles were found 5-10 days later.

The results indicated that MI-1 has a faster rate of development and a shorter life-cycle than MI-3 or MJ. This agrees with the studies of El-Saedy (1981) who showed that galling and reproduction of MI-1 on soybean cv. Cobb was higher than MI-3 or MJ.

Microscopic observations of soybean roots of 2 cvs Bragg and Calland infected with MI-3 showed that infective J2 penetrated the roots of both cultivars 2 days after inoculation. In cv. Calland the third and forth juvenile stages and young females were detected in the root tissues 4,8 and 20 days, respectively, after inoculation while in cv. Bragg these stage appeared after 6,15 and 25 days, respectively. Egg-laying females were observed after 30 days in Calland and 50 days in Bragg.

It is evident that MI-3 developed faster on Celland (susceptible) than on Bragg (resistant). Nematode galls and egg masses produced on Bragg were smaller in size and fewer in number than those found on Calland. The complete life cycle of MI-3 from egg to egg required 30 days in Calland and 50 days in Bragg. Previous studies of El-Saedy (1981) showed that Calland was susceptible to MI-3 as large numbers of root galls and egg masses developed on infected plants whereas Bragg was resistant to this nematode race. In general, these findings agree with those of Michell *et al.* (1973) who reported that *M. naasi* race 5 had a faster rate of development on barley than races 1-4. Also, Ibrahim *et al.* (1981) showed that *M. javanica* developed faster on the susceptible cotton cv. Giza 69 with a life cycle of 34 days whereas on resistant cv. Acala 4-42 the nematode had a slow rate of development and did not deposite any egg up to 76 days after inoculation. Ibrahim and Massoud (1974) reported that *M. javanica* females oviposited 30 days after inoculation and the life cycle was completed within 35 days in the roots of soybean cv. N.C. Hampton.

SUMMARY

The development of *Meloidogyne incognita* (races 1 and 3) and *M. javanica* on soybean cv. Cobb was determined in the greenhouse. Second stage juveniles of the nematode penetrated the roots within 12 hrs after inoculation. Development in root tissues proceeded normally to the egg laying females with slight periodical variations. The life cycle duration of *M. incognita* race 1, *M. javanica* and *M. incognita* race 3 was 40, 45 and 50 days, respectively. In another test, the life cycle of *M. incognita* race 3 was completed within 30 and 50 days after inoculation in roots of cvs Calland (susceptible) and Bragg (resistant), respectively.

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